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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/937,272	09/24/2001	Takeshi Azami	14952	9523

7590

09/09/2002

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EXAMINER

SONG, MATTHEW J


ART UNIT

PAPER NUMBER

1765

DATE MAILED: 09/09/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	09/937,272	AZAMI ET AL. 	
	Examiner	Art Unit	
	Matthew J Song	1765	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) 4-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 September 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☒ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |                                                                                                 |                                                                             |
|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input checked="" type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____    | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Priority***

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Japan on 3/24/1999. It is noted, however, that applicant has not filed a certified copy of the 79250/1999 application as required by 35 U.S.C. 119(b).

### ***Claim Objections***

2. Claims 4-14 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only, and/or, cannot depend from any other multiple dependent claim. See MPEP § 608.01(n). Accordingly, the claims 4-14 have not been further treated on the merits.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-3 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant recites the limitation of “a predetermined atmosphere” in line 2 of claim 1; “predetermined” is indefinite, likewise in line 4 of claim 1 for a “predetermined state”.

### ***Claim Rejections - 35 USC § 102***

Art Unit: 1765

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Ownby et al (US 4,400,232).

Ownby et al discloses oxygen related defects occur in the production of single crystal silicon from molten silicon (i.e. claim 3), for example in the Czochralski or float zoning techniques and a process for carefully controlling the presence of oxygen defects in the production of silicon bodies (col 1, ln 15-65). Ownby et al also discloses oxygen and carbon related defects can be controlled and reduced through deliberate addition of an oxygen containing buffering gas to the silicon processing chamber and maintain the oxygen partial pressure, this is interpreted by the examiner to read on applicant's control of one specific element contained in the atmosphere, in the chamber atmosphere at a low defect production level, which is less than about  $10^{-6}$  atmosphere (col 2, ln 1-67). Ownby et al also discloses inlet gases may be mixed with an inert carrier gas, for example argon. Ownby et al discloses a single crystal of silicon being pulled from a melt in a Czochralski furnace comprising a crucible containing a melt of elemental silicon 25 (col 3, ln 5-67 and col 4, ln 1-25), a partial pressure of oxygen sensor within a furnace chamber (col 5, ln 1-65), and controlling the flow ratios of admitted gases to control the partial pressure of oxygen (col 6, ln 5-60).

7. Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Huang et al (US 5,524,574).

Huang et al discloses a single crystal pulled from a Sb-doped Si melt (col 4, ln 40-67) and the oxygen concentration of a Si single crystal pulled up from a Si melt (i.e. claim 3) depends on the diffusion of oxygen from the surface of the melt. Huang et al also discloses the diffusion of oxygen from the melt to the atmosphere can be controlled by the pressure of the atmosphere, this reads on applicant's controlling one specific element in the atmosphere (col 5, ln 5-67). Huang et al also discloses a single crystal obtained from a melt has a higher oxygen concentration when a pressure is held at a higher value, the diffusion of oxygen to the atmosphere is suppressed so that the upper layer of the melt is maintained at a higher oxygen concentration and vice versa for a lower pressure. Huang et al also discloses the oxygen concentration of a single crystal to be pulled from a melt can be adjusted at a predetermined value by controlling the atmospheric pressure (col 6, ln 1-67). Huang et al also discloses argon as an atmospheric gas for the growth of a single crystal and an oxygen sensor **17** serving as a detector for detecting the partial pressure of oxygen in an internal atmosphere, which is inputted to a control unit **18** (col 7, ln 1-67). Huang et al also discloses a melt surface in an opening of a crucible (Fig 1). Huang et al also discloses a single crystal pulled from a Czochralski melt has a very high oxygen concentration and oxygen concentration in the upper layer of the melt is controlled by changing the atmospheric conditions (col 15, ln 1-45). Huang et al also discloses an equation relating the partial pressure of oxygen and the oxygen concentration in the upper layer of the melt (Equation 4 and Table 2).

*Conclusion*

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Naumann et al (US 4,740,264) teaches a float zone growth method of controlling Marangoni flows can be enhanced by operating in a microgravity of an orbiting spacecraft in which buoyancy driven convection can also be controlled and hydrostatic pressure no longer restricts the size of the crystal that can be grown (col 2, ln 50-67 and col 3, ln 1-67).

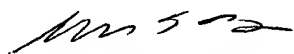
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J Song whose telephone number is 703-305-4953.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin L Utech can be reached on 703-308-3868. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Matthew J Song  
Examiner  
Art Unit 1765

MJS  
September 5, 2002

  
**BENJAMIN L. UTECH**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 1700**